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None

(58) Field of search

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(54) Five-layered container.

(57) A five-layered container is obtained by biaxial orientation blow molding of an injection-molded, five layer-structured parison, wherein a centre layer and innermost and outermost layers (3) comprise resin A and the two intermediate layers (4) between the innermost layer and the center layer and between the outermost layer and the center layer comprise resin B, said resin A comprising a polyester resin containing ethylene terephthalate as a main recurring unit and said resin B comprising a polyester resin containing ethylene terephthalate as a main recurring unit and polyarylate, at least one of said resins A and B further containing a m-xylylene group-containing polyamide resin.

FIG. 1

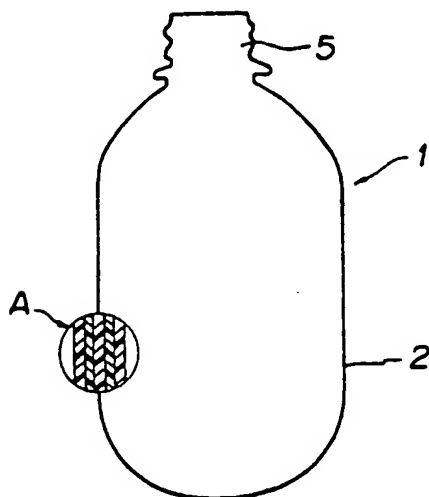
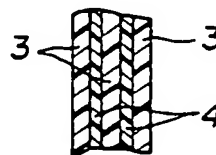


FIG. 2



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FIG. 1

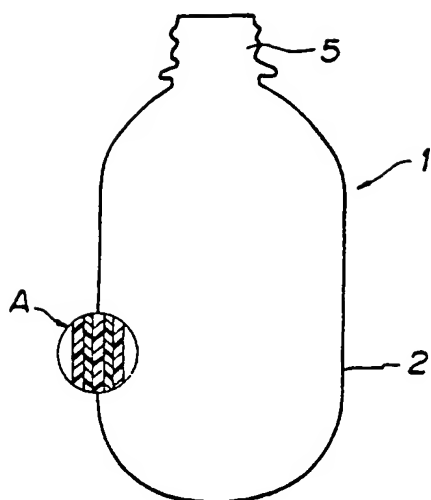


FIG. 2

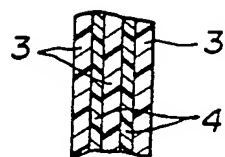
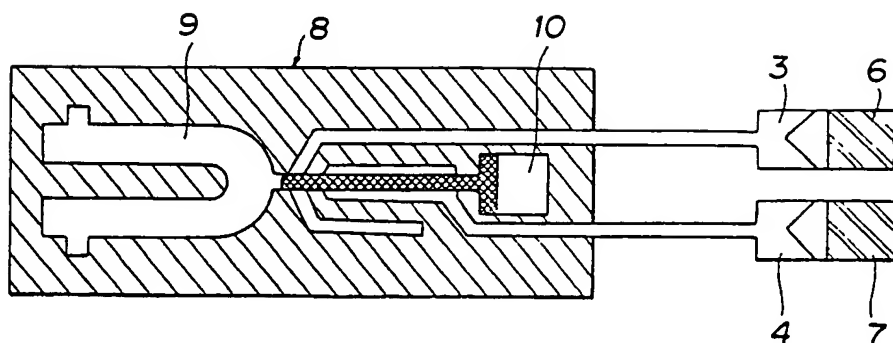


FIG. 3



- 1 -

FIVE-LAYERED CONTAINER

This invention relates to a five-layered container molded by biaxial orientation blow molding. More specifically, it relates to a five-layered container having gas barrier property and simultaneously having heat resistance sufficient for high-temperature filling.

Polyethylene terephthalate containers manufactured by injection molding and biaxial orientation blow molding have high rigidity and high mechanical strength owing to orientation. Therefore, these containers are now widely used as containers for foods such as carbonated beverages, and cosmetics.

Since, however, polyethylene terephthalate containers have a poor gas barrier property against oxygen, they suffer the disadvantage of short shelf life for contents which are susceptible to oxygen gas.

Further, polyethylene terephthalate has a glass transition point in the vicinity of 70°C and containers thereof have strain caused at the time of blow molding. Therefore, it had not been possible to fill polyethylene terephthalate containers with contents at a temperature of 65°C or above.

Heat set technology has been developed which comprises holding a wall portion of a blow molded container under heat treatment at 100 to 130°C to remove residual strain and also technology of whitening an open end portion of a container by crystallization by heating the open end portion with hot air or a heater. These technologies have made possible heat resistant polyethylene terephthalate containers which can endure filling with contents at a temperature as high as 85°C.

However, such processes require a long period

of processing time for heat setting and whitening of an open end portion, and there is a problem that the manufacturing steps in these processes are made complicated.

As one of the solutions of the above problems,
5 Japanese Laid-Open Patent Publications Nos. 96652/1975 and 160/1982 and Japanese Patent Publication No. 60020/1982 propose polymer alloy obtained by melt-blending polyethylene terephthalate and polyarylate and containers made thereof, and these containers are now put to practical use as heat
10 resistant ones. However, it is pointed out that this solution shows degraded gas barrier property and moldability.

Further, another proposed method for improvement of heat resistance in polyethylene terephthalate containers is to combine polyethylene terephthalate with a heat resistant resin,
15 and, for example, Japanese Laid-Open Patent Publications Nos. 154234/1980, 204552/1984, 71622/1987 and 77908/1987 describe multi-layered containers using a resin composition of polyarylate and polyethylene terephthalate. Meanwhile, as a method for making up for the insufficient gas barrier property
20 of a polyethylene terephthalate container, there are known a three-layered container comprising inner and outer layers of polyethylene terephthalate resin and a center layer of polyamide resin, which uses m-xylylene group-containing polyamide as a barrier material and is produced by using an
25 injection molding machine having two cylinders (U.S. Patent 4,353,901), and another five-layered container comprising innermost and outermost layers of polyethylene terephthalate resin and two intermediate layers of m-xylylene group-containing polyamide resin.

30 SUMMARY OF THE INVENTION:

It is an object of this invention to provide a five-layered container excellent both in heat resistance and gas barrier property.

It is another object of this invention to provide a
35 five-layered container excellent in moldability.

It is further another object of this invention to provide a five-layered container excellent in mechanical

strength.

It is yet another object of this invention to provide a five-layered container excellent in the above-mentioned properties obtained by biaxial orientation blow
5 molding.

This invention provides a five-layered container obtained by biaxial orientation blow molding of an injection-molded, five layer-structured parison, wherein a center layer and innermost and outermost layers comprise resin A, two
10 intermediate layers between the innermost layer and the center layer and between the outermost layer and the center layer comprise resin B, the resin A comprises a polyester resin containing ethylene terephthalate as a main recurring unit, the resin B comprises a polyester resin containing ethylene
15 terephthalate as a main recurring unit and polyarylate, and at least one of said resins A and B further contains a m-xylylene group-containing polyamide resin.

BRIEF DESCRIPTION OF THE DRAWINGS:

Figure 1 is a front view of a five-layered container
20 according to the present invention and a partial cross sectional view of same. Figure 2 is an enlarged cross sectional view showing the layer structure of the body portion A of the container shown in Figure 1. Figure 3 is a schematic side view of an injection molding machine usable in the
25 manufacture of a five-layered container according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION:

The present inventors have made diligent studies of processes for the manufacture of containers to obtain a five-
30 layered container which satisfies all of moldability, mechanical strength, heat resistance and gas barrier property. As a result, they have found a combination of resins and layer structure which satisfy all of the above performances, and succeeded in manufacture of a five-layered container meeting
35 all of the above performances.

Namely, the present invention is concerned with a five layer-structured container obtained by biaxial

orientation blow molding of a parison obtained by injection molding of a polyester resin containing ethylene terephthalate as a main recurring unit, a polyarylate and a polyamide resin containing m-xylylene group. In the five-layered container
5 according to the present invention, a resin A, which forms the innermost and outermost layers and the center layer, comprises an identical resin containing a polyester resin at least containing ethylene terephthalate as a main recurring unit, and a resin B, which forms two intermediate layers
10 between the innermost layer and the center layer and between the outermost layer and the center layer, comprises an identical resin containing a polyester resin, which contains ethylene terephthalate as a main recurring unit, and polyarylate.

15 Figure 1 shows a front view of a five-layered container according to the present invention and an enlarged cross sectional view of a portion of same. As shown in Figure 1, A, and Figure 2, the thin body portion 2 of the five-layered container is formed of innermost, outermost and center
20 layers 3 of resin A and two intermediate layers 4 of resin B. The end opening portion 5 of the mouth portion of the container is formed of only resin A and does not have the five-layered structure.

In the present invention, the polyester resin
25 containing ethylene terephthalate as a main recurring unit stands for polyesters in which, usually, the acid content comprises not less than 80 mole% of terephthalic acid and the glycol content comprises not less than 80 mole%, preferably not less than 90 mole%, of ethylene glycol. Examples of the
30 other acids for the remaining portion of the acid content include isophthalic acid, hexahydroterephthalic acid, biphenyl ether-4,4-dicarboxylic acid, naphthalene-1,4-dicarboxylic acid, and naphthalene-2,6-dicarboxylic acid. And examples of the other glycols for the remaining portion of the glycol
35 content include propylene glycol, 1,4-butanediol, neopentyl glycol, diethylene glycol, cyclohexanedimethanol, 2,2-bis(4-hydroxyethoxyphenyl)propane, and the like.

It is further possible to cite polyester resin containing p-oxybenzoate, etc., as oxyacids.

The suitable intrinsic viscosity, measured at 25 °C by using a mixture of phenol and tetrachloroethane (6:4 by weight) as a solvent, of the above thermoplastic polyesters is 0.55 to 1.4, and preferable one is 0.65 to 1.4.

If the above intrinsic viscosity is less than 0.55, it is not only difficult to obtain the parison in transparent non-crystalline state, but also the mechanical strength of the resultant containers is insufficient.

If the above intrinsic viscosity exceeds 1.4, the resistance in a resin passage in a mold increases and the load in a cylinder increases. As a result, it is impossible to obtain a parison having excellent dimensional stability by injection molding.

In the present invention, the polyarylate represents those obtained from aromatic dicarboxylic acid or its derivative and divalent phenol or its derivative.

Any aromatic dicarboxylic acid may be used as a material for the above polyarylate if it reacts with divalent phenol to give a satisfactory polymer, and two or more of such dicarboxylic acids may be used in combination.

As preferable aromatic dicarboxylic acids, it is possible to cite terephthalic acid and isophthalic acid. Especially, a mixture of these is more preferable in terms of melt-processability and performances.

When the mixture of terephthalic acid and isophthalic acid is used, the terephthalic acid/isophthalic acid mixing ratio is 9/1 to 1/9 (molar ratio), and the ratio of 7/3 to 3/7 (molar ratio) is preferable in terms of melt-processability and performances.

Preferable examples of the divalent phenol includes 2,2-bis(4-hydroxyphenyl)propane, 2,2-bis(4-hydroxy-3,5-dibromophenyl)propane, 2,2-bis(4-hydroxy-3,5-dichlorophenyl)propane, 4,4'-dihydroxyphenylsulfon, 4,4'-dihydroxydiphenyl ether, 4,4'-dihydroxydiphenylsulfide, 4,4'-dihydroxydiphenyl methane, 2,2'-bis(4-hydroxy-3,5-dimethylphenyl)propane, 1,1-

bis(4-hydroxyphenyl)ethane, 1,1-bis(4-hydroxyphenyl)cyclohexane, 4,4'-dihydroxyphenyl, benzoquinone, and the like. These may be used alone or in combination with one other or others. Besides these p-substituted divalent phenols, the
5 other isomers may be used, and further, up to 30 mole% of ethylene glycol, propylene glycol, or the like may be used in combination with the divalent phenol.

The most typical example of the divalent phenols is 2,2-bis(4-hydroxyphenyl)propane called usually as bisphenol-A,
10 and is most preferably used in view of physical properties.

Accordingly, examples of the most preferable polyarylate in the present invention are those obtained from a mixture of terephthalic acid and isophthalic acid or derivatives thereof and divalent phenol, especially bisphenol-
15 A or its derivative.

In this invention, the m-xylylene group-containing polyamide resin stands for polymers containing not less than 70 mole% of structural units obtained from m-xylylene diamine alone or a mixture of m-xylylene diamine and not more than 30%
20 by weight, based on the mixture weight in total, of p-xylylene diamine and α,ω -aliphatic dicarboxylic acid having 6 to 10 carbon atoms.

Examples of the above polymers include homopolymers such as polymetaxylylene adipamide, polymetaxylylene
25 sebacamide, polymetaxylylene suberamide, etc., copolymers such as m-xylylene/p-xylylene adipamide copolymer, m-xylylene/p-xylylene azelamide copolymer, etc., and copolymers of constituents of said homo- or copolymers with an aliphatic diamine such as hexamethylenediamine, an aromatic diamine such
30 as p-bis-(2-aminoethyl)benzene, an aromatic dicarboxylic acid such as terephthalic acid, a lactam such as ϵ -caprolactam, or an aromatic aminocarboxylic acid such as ω -aminocarboxylic acid, p-aminobenzoate.

Further, these polymers may contain a polymer such
35 as nylon 6, nylon 66, nylon 610, nylon 11, etc.

The relative viscosity, measured in a solution, at 25 °C, of 1 g of the sample resin in 100 ml of 96 % sulfuric

acid, of these m-xylylene group-containing polyamide resins is 1.5 to 4.0, preferably 2.0 to 4.0. That is because the viscosity of the polyamide resin and the viscosity of the polyester resin are adjusted to be nearly in agreement at a temperature in a resin flow passage when the injection molding of parisons is carried out. If there is a large difference between the viscosities of these resins, it is difficult to injection-mold a parison having a uniform thickness.

In the present invention, it is possible to incorporate a coloring agent, UV ray absorbent, etc., to both or one of resins A and B to an extent that such incorporated additives do not impair the object of the present invention.

The polyarylate usable in this invention may be those obtained by incorporating a polyarylate alone into a polyester resin containing ethylene terephthalate as a main recurring unit or carrying out ester-exchange of a mixture of a polyester resin containing ethylene terephthalate as a main recurring unit and a polyarylate while the mixture is melted.

The above ester-exchange reaction is, specifically, carried out by melt-extrusion or stirring the mixture in a reactor while it is melted.

In view of the moldability, heat resistance, etc., of the five-layered container to be obtained according to this invention, it is desirable to use a polyarylate which has been subjected to the above ester-exchange reaction.

The five-layered container of this invention is obtained by biaxial orientation blow molding of a parison having a five layer structure in which the innermost, outermost and center layers comprise an identical resin (resin A) and the two intermediate layers comprise another identical resin (resin B).

The following is an explanation of the process for the manufacture of such a parison.

Figure 3 shows a schematic side view of an injection molding machine usable for the manufacture of the parison in the present invention.

Like usual injection molding machines, the above

injection molding machine has a cylinder (6) for resin A and a cylinder (7) for resin B, and it is capable of injecting the molten resin A (3) and the molten resin B (4) into a cavity (9) of a mold (8), respectively.

5 In injection molding, at first, a part of the molten resin A is injected into the cavity (9) from the cylinder (6). Then, the injection of the resin A was stopped, and the molten resin B is injected into the cavity (9) from the cylinder (7). Thereafter, the injection of the resin B is stopped, and the
10 resin A is re-injected to fill the cavity (9) completely. And then, a gate-cutting pin located at fore-end of an air cylinder (10) is moved to the cavity side. The above procedure makes it possible to obtain a five-layered parison having its bottom portion and open end portion sealed with
15 resin A.

 Then, the above five-layered parison is reheated to a temperature at not lower than 100°C, then transferred into a mold for a container and subjected to biaxial orientation blow molding by an orientation rod and air pressure to give a five-
20 layered container.

 Preferred examples of the combinations of resins in use for resin A and resin B are as follows.

 (1) polyethylene terephthalate for resin A and a resin obtained by mixing a resin composition of polyethylene
25 terephthalate and polyarylate with a m-xylylene group-containing polyamide resin for resin B.

 (2) a resin obtained by mixing polyethylene terephthalate with a m-xylylene group-containing polyamide resin for resin A and a resin composition of polyethylene
30 terephthalate and polyarylate for resin B.

 In the above combination (1), the layer of resin A gives mechanical strength and the layer of resin B gives heat resistance and gas barrier property. Owing to the presence of polyethylene terephthalate both in resin A and resin B, the
35 above combination makes the interlayer bonding better between layers of resins A and B. As a result, the heat resistance and gas barrier property are efficiently exhibited.

Further, polyethylene terephthalate used as resin A in the above combination (1) is excellent in transparency, the biaxial orientation blow molding gives five-layered containers excellent in transparency.

5 In the above combination (2), resin A gives mechanical strength and gas barrier property, and resin B gives heat resistance. This combination (2) also uses polyethylene terephthalate in both resin A and resin B. Therefore, the interlayer bonding between resin A and resin B
10 is made better and, as a result, the heat resistance and gas barrier property are efficiently exhibited.

 In the above combinations (1) and (2), it is desirable that the melting viscosities of resin A and resin B are nearly identical with each other at the time of injection
15 molding.

 The proportion of the polyarylate in use can be in the range of from 2 to 20% by weight based on the total weight of resins in use for the container. Since, however, polyarylate is expensive and poor in transparency, it is
20 desirable that the above proportion is in the range of from 3 to 10% by weight in view of transparency and mechanical strength.

 The proportion of the m-xylylene group-containing polyamide resin in use is in the range of from 1 to 20% by
25 weight based on the total weight of resins in use for the container, and it is preferably in the range of from 3 to 10% by weight.

 If the proportion of the m-xylylene group-containing polyamide resin is less than 1% by weight, the performance in
30 gas barrier property is not improved. On the other hand, since mxylylene group-containing polyamide resin is, in general, inferior in mechanical strength and transparency as compared with polyethylene terephthalate, etc., the use of more than 20% by weight thereof causes problems in
35 performance, and the gas barrier property is not improved as expected.

 According to the present invention, it is made

possible to obtain a five-layered container having excellent gas barrier property and heat resistance.

According to the present invention, it is made further possible to obtain a five-layered container having
5 excellent moldability and mechanical strength.

EXAMPLES

The present invention will be illustrated hereinbelow according to Examples. In the Examples, the properties, etc., were measured according to the following
10 methods.

(1) Haze:

Measured by ASTM D1003-61 using a digital hazemeter (NHD-2~~5~~ made by Nippon Denshoku Kogyo K.K.)

(2) Oxygen permeability

Measured substantially in accordance with ASTM
15 D3985-81.

Measurement temperature: 20 °C

Interior relative humidity: 100%

Exterior relative humidity: 65%

20 (3) Evaluation on heat resistance:

Five-layered containers having a volume of 1.5 liters (height: 308 mm, body outer diameter: 91.5 mm) were used and volume contraction ratios of the containers were measured when the containers were filled with hot water at 85°C
25 and 90°C.

Specifically, the containers were filled with water at the above temperatures, capped and left to stand for 5 minutes. Then, the containers were cooled with water, left to stand at room temperature for 1 day, and decreases in volumes
30 of the containers were measured. Heat resistance was evaluated on the basis of volume contraction ratios of the containers.

(4) Intrinsic viscosity of polyester resin [η]:

Measured substantially in accordance with ASTM
35 D2857. The solvent used is as follows.

Phenol/tetrachloroethane mixed solvent having a phenol/chloroethane weight ratio of 6/4 was used.

Measurement temperature: 25°C

(5) Relative viscosity of polyamide resin [5.1]:

Measured substantially in accordance with JIS K6810-1977. The solvent used is as follows.

5 1g Resin /100 ml 96% sulfuric acid.

Measurement temperature: 25°C

EXAMPLE 1

A polyethylene terephthalate having an intrinsic viscosity of 0.83 (to be abbreviated as PET hereinbelow) was
10 used as the resin A.

In the resin B, there were used a resin composition composed of polymetaxylylene adipamide (to be abbreviated as N-MXD6 hereinbelow, trade name: MX nylon 6007 made by Mitsubishi Gas Chemical Co., Inc., relative viscosity: 2.1), a
15 polyester resin containing ethylene terephthalate as a main recurring unit and polyarylate. The resin composition composed of a polyester resin and polyarylate was a polymer alloy composed of PET and polyarylate. (Said polymer alloy is "U-8400" made by Unitika K.K., which is composed of 42 parts
20 by weight of a polyarylate obtained from a terephthalic acid/isophthalic acid mixed acid having a mixture molar ratio of 1:1 as aromatic dicarboxylic acid and bisphenol A as divalent phenol and 58 parts by weight of polyethylene terephthalate.) The resin B had a N-MXD6 : U-8400 composition
25 ratio of 20 : 80 by weight.

The resin A had a melt viscosity of 6,500 poise at 270°C and U-8400 in the resin B had a melt viscosity of 6,000 at 280°C.

At first, a two cylinder-type injection molding
30 machine was used to injection-mold a five-layered parison composed of innermost, outermost and center layers of the resin A and two intermediate layers of the resin B and having an outer diameter of 26 mm, height of 145 mm and thickness of 4.5 mm.

35 The proportions of amounts of the resins A and B in the above injection molding were as follows.

1st injection (resin A) : 35 %

2nd injection (resin B) : 25 %

3rd injection (resin A) : 40 %

The temperatures in the above injection molding were set as follows.

5 Injection cylinder for resin A : 280°C

Injection cylinder for resin B : 270°C

Resin flow passage in mold : 280°C

Mold-cooling water : 15°C

Then, the resultant parison was transferred to a
10 container mold of a biaxial orientation blow molding machine,
heated until the temperature on the surface of the parison
became 100 to 110°C, and was subjected to biaxial orientation
blow molding under the conditions where the feed rate of an
orientation rod was 20 cm/sec., and the orientation blowing
15 pressure was 20 kg/cm², thereby to obtain a five-layered
container having an inner volume of 1.5 liters, outer diameter
of 91.5 mm, height of 308 mm and weight of 64.5 g.

The resultant five-layered container was subjected
to tests for evaluations of oxygen permeability and heat
20 resistance. Table 1 shows the results of the evaluations in
the tests.

The haze of the body portion of the resultant five-layered container was measured to show 4.45 %.

EXAMPLE 2

25 The procedure of Example 1 was repeated by using, as
resin A, a resin composed of a mixture of 95 % by weight of
PET having an intrinsic viscosity of 0.83 and 5 % by weight
of N-MXD6 (trade name: MX nylon 6007 made by Mitsubishi Gas
Chemical Co., Inc.) having a relative viscosity of 2.1 and as
30 resin B, the same polymer alloy (trade name: U-8400 made by
Unitika K.K.) as was used in Example 1, to injection-mold a
five-layered parison. The resultant parison was subjected to
biaxial orientation blow molding in the same way as in Example
1 to obtain a five layered container having an inner volume of
35 1.5 liters.

The above five-layered container was subjected to
tests for evaluations of oxygen permeability and heat

resistance.

Table 1 shows the results of the evaluations.

COMPARATIVE EXAMPLE 1

The procedure of Example 1 was repeated to
5 injection-mold a five-layered parison by using PET having an
intrinsic viscosity of 0.83 as resin A and the same polymer
alloy (trade name: U-8400 made by Unitika K.K.) which was used
in Example 1 as resin B. Then, the above parison was
subjected to biaxial orientation blow molding in the same way
10 as in Example 1 to obtain a five layered container having an
inner volume of 1.5 liters. The resultant five-layered
container was subjected to tests for evaluations of oxygen
permeability and heat resistance. Table 1 shows the results of
the evaluations.

15 The haze of the above five-layerd container was
measured to show 4.30%.

COMPARATIVE EXAMPLE 2

The procedure of Example 1 was repeated to
injection-mold a five-layered parison by using PET having an
20 intrinsic viscosity of 0.72 as resin A and N-MXD6, which was
the same as that used in Example 1, as resin B. Then, the
resultant parison was heated until the temperature on the
surface thereof became 80 to 100°C, transferred into a
container mold at 110°C, and the parison was subjected to
25 biaxial orientation blow molding in the same way as in Example
1, and then the container was held at 110°C for 15 seconds to
obtain a five-layered container having an inner volume of 1.5
liters. When the container was not subjected to heat
treatment at 110°C for 15 seconds, the container wall portion
30 was elliptically deformed by charging hot water at 85°C into
said container. The resultant five-layered container was
subjected to tests for evaluations of oxygen permeability and
heat resistance. Table 1 shows the results of the evaluations.

The data in Table 1 shows that the five-layered
35 containers obtained in Examples 1 and 2 have decreased oxygen
permeabilities owing to the use of MX nylon as compared with
those of Comparative Examples 1, i.e., the gas barrier

properties thereof are improved. Further, it is seen that the heat resistances are nearly equal among these three Examples. And the five-layered containers in Examples 1 and 2 have shown improved heat resistences as compared with those of

5 Comparative Example 2, and the gas barrier properties are nearly equal among these three Examples.

Table 1

Resin Composition	Resin A (wt.%)	Example 1	Example 2
		PET :100	PET : 90
	Resin B (wt.%)	U-8400 : 80	N-MXD6 : 5
		N-MXD6 : 20	U-8400 : 100
Proportions of resins in container:			
	Polyarylate	4.2 wt.%	5.2 wt.%
	N-MXD6	2.3 wt.%	4.0 wt.%
Results of evaluations:			
	Amount of permeated oxygen (ml/container/day):	0.0439	0.0416
	Volume contraction ratio		
	(1) at 85°C	1.2 %	1.6 %
	(2) at 90°C	3.4 %	3.2 %

Table 1 (continued)

Resin composition	Resin A (wt.%)	C-Example 1	C-Example 2
		PET :100	PET : 100
	Resin B (wt.%)	U-8400 :100	N-MXD6 : 100
Proportions of resins in container:			
	Polyarylate	5.2 wt.%	0 wt.%
	N-MXD6	0 wt.%	4.0 wt.%
Results of evaluations:			
	Amount of permeated oxygen (ml/container/day):	0.0730	0.0420
	Volume contraction ratio		
	(1) at 85°C	1.2 %	5.0 %
	(2) at 90°C	2.7 %	7.5 %

CLAIMS

1. A five-layered container obtained by biaxial orientation blow molding of an injection-molded, five layer-structured parison, wherein a center layer and innermost and outermost layers comprise resin A and the two intermediate
5 layers between the innermost layer and the center layer and between the outermost layer and the center layer comprise resin B, said resin A comprising a polyester resin containing ethylene terephthalate as a main recurring unit and said resin B comprising a polyester resin containing
10 ethylene terephthalate as a main recurring unit and a polyarylate, at least one of said resins A and B further containing a m-xylylene group-containing polyamide resin.
2. A container according to claim 1 wherein the resin A comprises a polyester resin containing ethylene
15 terephthalate as a main recurring unit and the resin B comprises a polyester resin containing ethylene terephthalate as a main recurring unit, a polyarylate and a m-xylylene group-containing polyamide resin.
3. A container according to claim 1 wherein the resin A
20 comprises a polyester resin containing ethylene terephthalate as a main recurring unit, and a m-xylylene group-containing polyamide resin and the resin B comprises a polyester resin containing ethylene terephthalate as a main recurring unit and a polyarylate.
- 25 4. A container according to claim 3 wherein the resin B

is a mixture of the polyester resin and a polyarylate.

5. A container according to claim 3 wherein the resin B is one obtained by an ester-exchange reaction of a polyester resin and a polyarylate.

5 6. A container according to any one of the preceding claims wherein the proportion of polyarylate is 2 to 20% by weight based on the total amount of resin of the container.

7. A container according to any one of the preceding
10 claims wherein the proportion of the m-xylene group-containing polyamide resin is 1 to 20% by weight based on the total amount of resin of the container.

8. A container according to any one of the preceding claims wherein the acid component of the polyester resin
15 comprises not less than 80 mole% of terephthalic acid and the glycol component of the polyester resin comprises not less than 80 mole% of ethylene glycol.

9. A container according to claim 8 wherein the intrinsic viscosity of the polyester resin is 0.55 to 1.4.

20 10. A container according to any one of the preceding claims wherein the polyarylate is one obtained from aromatic carboxylic acid and a divalent phenol.

11. A container according to claim 10 wherein the aromatic carboxylic acid is a mixture of terephthalic acid
25 and isophthalic acid having a terephthalic acid/isophthalic acid molar ratio of from 9/1 to 1/9.

12. A container according to any one of the preceding claims wherein the m-xylylene group-containing polyamide resin is a polymer containing at least 70 mole% of structural units obtained from m-xylylene diamine alone or a
5 mixed xylylene diamine containing m-xylylene diamine and not more than 30% by weight, based on the total weight, of p-xylylene diamine and α,ω -aliphatic dicarboxylic acid having 6 to 10 carbon atoms.
13. A container according to claim 12 wherein the
10 relative viscosity of the m-xylylene group-containing polyamide resin is 1.5 to 4.0.
14. A container according to claim 1 substantially as described with reference to Example 1 or 2.